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FRANCIS ARTHUR BAINBRIDGE, 1874–1921.

In the death of Francis Arthur Bainbridge, at the early age of 47 years, Physiology has lost an enthusiastic and successful investigator and a teacher of ability and influence. He was elected to the Fellowship of the Royal Society in 1919, and it was but a few months later that he showed the first definite signs of the ill-health, which culminated in a brief, acute illness, and death on October 27, 1921.

Bainbridge entered the Leys School with a scholarship in 1888, and passed from there in 1893 with an entrance exhibition to Trinity College, Cambridge, of which foundation he subsequently became a major scholar. His student career was on normal lines for a man of his ability and studious habit, but, on finishing the Natural Sciences Tripos, in both parts of which he was placed in the first class, he left Cambridge for St. Bartholomew's Hospital, shaping his course with a view to the practice of medicine. After qualification, he held several minor appointments in physiology and pathology, while waiting for opportunities of advance in the career which he had then chosen; but his natural bent was already obvious, in the devotion of the time which he could spare from his official duties to research in physiology, which he carried on in the physiological laboratory at University College.

In this period he made a series of investigations into the mechanism of lymph-formation, which brought clearly into view the influence of activity in gland cells on the outpouring of lymph from the blood-vessels of the gland. These and other phenomena of lymph-formation, which some had regarded as indicating a process of active secretion by the capillary endothelium, he brought into harmony with Starling's simpler physical conception, producing ingenious experimental evidence in support of that point of view. He became active also in the new field of investigation opened up by Bayliss and Starling's discovery of Secretin, which was made at this time. Bainbridge, however, unable as yet to give to physiology an undivided allegiance, had neither the time nor the impulse to acquire that full command of specialised technique and experience needed for an essentially biochemical investigation. When eventually, in 1905, he abandoned the idea of medical practice, it was to accept the Gordon Lectureship on Pathology at Guy's. Here, with A. P. Beddard, he began a series of elegant experiments on the secretion of urine by the frog's kidney, which he resumed on his return to physiology in later years. With Beddard also he effected a useful revision of then current views as to the meaning of the sequelæ of partial nephrectomy.

Bainbridge left Guy's in 1907, and, wandering for some years yet further from physiology, was responsible, at the Lister Institute, for valuable contributions to the study and classification of the paratyphoid and food-poisoning group of bacilli. This work formed later the basis of his Milroy Lectures to the Royal College of Physicians.

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It would seem that, up to this period, Bainbridge had so divided his aims and his interests that onlookers found it difficult to place him. The few who knew him intimately felt that his worth and ability had yet to win a full and general appreciation. When the intermittent manner of its accomplishment is remembered, it appears that his output in physiology was already remarkable; but he had never yet been in a position to regard it as his life-work, and his sound contributions to other branches of medical science seemed, with many, to weaken rather than strengthen his claim and his promise as a physiologist.

It was not till 1911 that his election to the Chair of Physiology of Durham University, in Newcastle, enabled Bainbridge at length to devote himself whole-heartedly to the line of work which most truly held his interest, and for which he felt himself best fitted by early training and natural aptitude. His department soon attained a high standard of efficiency in the training of students, and he resumed, with the late J. A. Menzies, his experiments on the frog's kidney. Later, he entered upon the series of investigations on the adjustment of the heart-beat to the demands of muscular exercise, which will probably rank as his most important and permanent contribution to Science. With Menzies also he wrote what has become one of the most popular and useful of the shorter text-books of physiology for medical students.

When war broke out in 1914 Bainbridge took a commission in the R.A.M.C., and doubled the duties of his Newcastle Chair with those of Medical Officer at a neighbouring military hospital. In 1915 he was appointed to the Chair of Physiology at his old hospital, St. Bartholomew's, in London, and combined the duties of this new Chair with those of an officer in the Anti-gas Service, experimenting at Millbank, or touring the country as a training-officer in defensive measures. Though he was active, and even rather athletic by inclination, his constitution was never really robust, and was not fitted for this unremitting overwork. The growing demands of his teaching necessitated the resignation of his commission, and, during the period of moderate health remaining to him, he found time to complete a monograph on "The Physiology of Muscular Exercise," which was published at the end of 1919, and was received with general appreciation by physiologists and others interested in its subject. It was, indeed, in many ways a model of what such a survey of knowledge should be, and the best proof which Bainbridge has left of one aspect of his ability. The presentation was clear and logical, and it showed a sound instinct for essentials, in a subject of which the main outlines have too often been obscured by controversy concerning details. The note of personal contact with the problem was clearly heard, but not unduly emphasised, and the monograph was generally recognised as a sound and scholarly achievement.

To those who had known Bainbridge long, it seemed that he changed far less than most men do. In later years the circle of his friendship widened greatly, but the associations formed in the early days always had first place

in his regard. Similarly, his experience and his influence widened; but those who had the privilege of intimacy with him found that his tastes and convictions, his fundamental attitude to life, changed remarkably little from those of his student-days. It may be that a rather prematurely cautious and reticent habit of mind had hampered his earlier career.

His stature was small, his manner quiet and unimpressive, and he had no great natural gift of vividness or eloquence in public speaking, though he became a clear and effective lecturer to students. These things, with his hesitation in committing himself definitely to the work for which he was best adapted, rather delayed the recognition which was only beginning to come to him in proper measure when he died. With health and opportunity, he would have carried much farther the work that he had begun.

Bainbridge married in 1905, and, to those who knew him well, the thought of his wife's brave and buoyant comradeship, through times of hesitation and disappointment, of success and recognition, and, finally, of stubborn fight against ill-health, is inseparable from his memory. His widow, his sisters, and his young daughter will have, in their sad loss, the sympathy of all who knew him, and especially of that smaller group, who, through years of intimacy, had come to know and to prize the steadfast affection, the quiet but unwavering loyalty to ideals and convictions, which were outstanding features of a fine character.

H. H. D.

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